ABSTRACT

Flat, quadrangular permanent magnets m18, m28, m38 are disposed on a yoke 20 with their magnetic pole faces facing upward and so as to be adjacent to one another or contact one another, and such that magnetic pole faces of different polarities are disposed alternately. A vibrating membrane 26 is disposed on a top surface side of the yoke 20 so as to be parallel to the magnetic pole faces of the permanent magnets. Coil pairs L18, L28, L38, which are wound in helical forms and are disposed at front and reverse surfaces of the vibrating membrane, are disposed on the vibrating membrane 26 so as to correspond to the permanent magnets m18, m28, m38. The coil pairs L18, L28, L38 are wound in helical forms so as to be formed substantially similarly to outer edges of the magnetic pole faces of the permanent magnets m18, m28, m38. Inner peripheries of the helices of the coil pairs are disposed at outer sides of regions which include positions corresponding to centers of the magnetic pole faces, and outer peripheries of the helices of the coil pairs are disposed so as to overlap one another. Because the permanent magnets are disposed on the yoke so as to be adjacent to or contact one another, magnetic flux traveling in a direction substantially parallel to a surface of the vibrating membrane becomes a maximum, and interlinks with the coil pairs. When current is supplied to the coils, a direction of force which the current receives from a magnetic field is a direction substantially orthogonal to the surface of the vibrating membrane, and force in a direction along the surface of the vibrating membrane becomes extremely low. Thus, noise components can be reduced such that sound quality can be improved.